

# Teaching System Administration

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# Why am I doing this?

- Educating people about system administration is important
- Relatively little course and curriculum material is available
- Provide examples and inspiration to potential educators

# How did this happen to me?

- I didn't originally have an ambition to be a teacher
- Attended LISA '99 System Administration Education Workshop on a whim
- Started asking computer science department faculty about a system administration class
  - First answer: “But that would be too practical!”
  - Second answer: “That would be great! Will you teach it?”

# What had I gotten myself into?

- The LISA education workshop had a wide representation of people and not a lot of common agreement:
  - Educators and non-educators
  - Academic and commercial organizations
  - Education or training?
  - Among educators, very different approaches to teaching
- The hard part is trying to nail down what system administration is all about

# So I had to design a class . . .

- My constraints:
  - 8-week summer session, so an *introductory* rather than a comprehensive class
  - Couldn't assume students would have extensive UNIX knowledge
  - Dedicated lab, but limited number of computers
    - No preinstalled OSes
    - 30 students, 10 computers
    - Limited access hours
  - No teaching assistant

# My personal notions about teaching

- I always hated unclear, underspecified assignments
- Students should have more than one way to learn
  - Lecture, textbook, personal interaction, independent study
- Principles along with practices
- Include non-technical aspects of system administration (communication, documentation, service to user community)

# Class structure

- Students work in groups
  - Emphasizes themes of collaboration and communication (but also cleverly handles limited lab space)
- Grade is primarily based on a series of projects to install and develop a system
  - Later added class discussions for points
  - Mostly objective grading (did it work or not?)

# Class website on-line

<http://www.cs.uoregon.edu/Classes/12U/cis399sysadmin>

- Previous years are also available

<http://www.cs.uoregon.edu/Classes/index.php?course=cis399sysadmin>

<http://www.cs.uoregon.edu/classes/index.php?course=cis410sysadmin>



# Week 1: Class setup

- Describe class structure and syllabus
- Get students to form groups
- Assign lab systems
- Introductory material on UNIX OS concepts

# Week 2: System Installation

- Assignment:
  - Install OS on lab computer and create installation document
  - Each group member must do at least one install and use version control on document
- Goals:
  - Learn about creating a documented, reproducible process
  - Introduction to version control software and concepts

# Week 3: Security and Network Configuration

- Assignment:
  - Describe how processes were started on running system
  - Turn off network services (except sshd)
  - Join network
  - Install OS patches
- Goals:
  - Ensure computers are safe on network
  - Introduction to basic security concepts
  - Learn about boot-time process creation

# Week 4: Network Services

- Assignment:
  - Build and install Apache httpd, Sendmail from source
  - Demonstrate ability to serve web pages, send and receive mail
- Goals:
  - Learn about software installation and configuration issues
  - Understand HTTP and SMTP as network services

# Week 5: Account management

- Assignment:
  - Create accounts on lab machines for all class members and me
  - Write simple use policy for system
- Goals:
  - Understand basics of account management and user support
  - Learn about policy issues

# Week 6: Logging and monitoring

- Assignment:
  - Collect examples of specified events from system logs
  - Implement basic access control
  - Write script and cron job to extract and mail log data
- Goals:
  - Understand logging and access control
  - Introduction to scripting and cron scheduling

# Week 7-8: Final Project

- Assignment:
  - Students propose and implement system administration project of their choice
  - Must consider concrete goals, user benefits, security, implementation and maintenance effort, documentation
- Goals:
  - Let students research a topic of their choice
  - Introduction to basic self-directed project management

# Dangerous choices that worked

- Working in groups
  - Fewer group issues than I anticipated
  - Stole a good idea (from Evi Nemeth) about group work evaluation: students each provide private estimates about member contributions
- Gave students their choice of operating system (of a freely-available UNIX or Linux distribution)
- System emergency day!



Question time!